

CLAIMS

1. An arrangement for controlling a system according to the deviation between the value measured on the system and the value estimated by means of a model of the controlled system of at least one control parameter, the arrangement comprising:
- 5 a neural network, which generates the estimation of said control parameter implementing said model as a function of a set of characteristic parameters of the controlled system and of respective configuration parameters of the neural network, said neural network having associated thereto a training module, which can train said neural network by modifying said configuration parameters according to a set of updating data;
- 10 an acquisition module for acquiring the actual value, as measured on the controlled system, of a set of sensing parameters comprising at least one from among said control parameter and said characteristic parameters of the controlled system; and
- 15 a variation module, which is sensitive to the variation of said control parameter and is able to generate an update-enable signal when said control parameter falls outside a pre-set tolerance range,
- said acquisition module being sensitive to said update-enable signal
- 20 for transferring to said training module, as said updating-data set, said set of sensing parameters.
2. The arrangement according to Claim 1, wherein said acquisition module comprises a truncation module for truncating the actual value of at least some of said characteristic parameters of the controlled system.
- 25 3. The arrangement according to Claim 1 wherein said acquisition module comprises a memory for storage of at least one of the parameters of said set of sensing parameters.
4. The arrangement according to Claim 3, wherein said acquisition module comprises a functional module for generating, according to the value
- 30 of at least one of said characteristic parameters of the controlled system an

address for storing said at least one control parameter.

5 **5.** The arrangement according to Claim 1 wherein said acquisition module comprises an input network for verifying whether said actual value, as measured on said controlled system, of at least one of said characteristic parameters of the controlled system that falls within an allowed range of variation.

6. The arrangement according to Claim 1 wherein said acquisition module comprises a sample-and-hold module for acquiring the value of said control parameter.

10 **7.** The arrangement according to Claim 1 wherein said variation module comprises a restore module for restoring at least one parameter of the controlled system when said control parameter falls outside said pre-set tolerance range.

15 **8.** The arrangement according to Claim 7, wherein said variation module comprises a timer with a count which can be activated when said control parameter falls outside said pre-set tolerance range and wherein said variation module is configured for emitting said update-enable signal when, once the count of said timer is through, said control parameter remains outside said pre-set tolerance range.

20 **9.** The arrangement according to Claim 1 wherein said variation module is configured to detect the deviation, with respect to said tolerance range, of the difference between the current value of said control parameter and the respective mean value.

25 **10.** The arrangement according to Claim 1 wherein said variation module is configured for operating according to a plurality of values of said control parameter, by detecting when a given number of said values of said control parameter falls outside said pre-set tolerance range.

11. The arrangement according to Claim 1 wherein said controlled system comprises at least one fuel cell.

12. The arrangement according to Claim 11, wherein said at least one control parameter is represented by the voltage generated by said at least one fuel cell.

13. The arrangement according to Claim 11 wherein said characteristic parameters of the controlled system are chosen from the group consisting of:

the current generated by said at least one fuel cell,
the quantity of air supplied to said at least one fuel cell, and
the temperature of said at least one fuel cell.

14. A method for controlling a system according to the deviation between the value measured on the system and the value estimated by means of a model of the controlled system of at least one control parameter, the method comprising:

generating the estimation of said control parameter implementing said model as a function of a set of characteristic parameters of the controlled system and of respective configuration parameters;
modifying said configuration parameters according to a set of updating data;
acquiring an actual value, as measured on the controlled system, of a set of sensing parameters comprising at least one from among said control parameter and said characteristic parameters of the controlled system; and
generating an update-enable signal when said control parameter falls outside a pre-set tolerance range.

15. The method according to Claim 14, further comprising truncating the actual value of at least some of said characteristic parameters of the controlled system.

16. The method according to Claim 14, further comprising verifying whether the actual value, as measured on said controlled system, of at least

one of said characteristic parameters of the controlled system falls within an allowed range of variation.

17. The method according to Claim 14, further comprising restoring at least one parameter of the controlled system when said control parameter
5 falls outside said pre-set tolerance range.

18. The method according to Claim 14, further comprising detecting the deviation, with respect to said tolerance range, of the difference between the current value of said control parameter and the respective mean value.

19. The method according to Claim 14, further comprising operating
10 according to a plurality of values of said control parameter, by detecting when a given number of said values of said control parameter falls outside said pre-set tolerance range.

20. The method according to Claim 14, wherein the method for controlling a system comprises a method for controlling at least one fuel cell.

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